

ABSTRACT

The present invention is a spray cooling thermal management device that cools an electronic component creating a varying amount of heat across its surfaces. Liquid coolant is dispensed upon the surface of the component. In areas of the chip that generate large heat fluxes, typically referred to as the core, the liquid coolant is dispensed as a continuous atomized droplet pattern. The atomized pattern creates a high heat flux evaporative cooling thin-film over the one or more core areas. Rather than optimize the atomized pattern and flow based upon complete thin-film vaporization, the present invention optimizes the atomized pattern for maximum heat removal rates. Any excess, non-vaporized, fluid flowing outward from the hotspot is used to cool the lower heat flux (non-core) areas of the component through the creation of a thick coolant film thereon.